4l

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,934	12/15/2003	Alex Nugent	1000-1207	3732

7590 03/02/2007

Ortiz & Lopez, PLLC
P.O. Box 4484
Albuquerque, NM 87196-4484

EXAMINER	
HIRL, JOSEPH P	
ART UNIT	PAPER NUMBER
2129	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/735,934	Applicant(s) NUGENT, ALEX	
	Examiner Joseph P. Hirl	Art Unit 2129	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,15-17 and 19-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,15-17 and 19-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to an AMENDMENT entered December 18, 2006 for the patent application 10/735934 filed on December 15, 2003.

2. All prior office actions are fully incorporated into this Final Office Action by reference.

Status of Claims

3. Claims 1-13, 15-17 and 19-23 are pending.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 17 and 20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The applicant's specification contains 93 pages and on page 78, ¶ 00271, line 6 the term "dielectrophoretic force" is use for the first and only time with no further discussion of how it is to be developed or controlled.

While the applicant has identified in the response dated December 18, 2006, page 14, Equation 1, the characteristics of such a force, such characteristics were not identified or discussed in the specification. Dielectrophoresis (DEP) is a phenomenon in which a force is exerted on a dielectric particle when it is subjected to a non-uniform electric field. Dielectrophoresis force depends on the volume of the particle and the gradient of the field magnitude squared. These two parameters can vary greatly in typical experimental and production conditions. The force further depends on the permittivity and conductivity of both the particle and the suspending medium, as well as the frequency of the applied field. The Dielectrophoresis force is a real force that acts on a particle and can be used for migration or retention. Dielectrophoresis migration uses opposing polarities of DEP forces exerted on different particle types, so that one type is attracted toward high-field regions by positive dielectrophoresis while the other types are repelled by negative dielectrophoresis. DEP retention uses competition between DEP and fluid-flow forces. Particles experiencing a weaker negative DEP forces are eluted by fluid flow, whereas particles experiencing strong positive DEP forces are trapped at electrode edges against the drag of the fluid flow. For these reasons, the Examiner is of the opinion that since the applicant did not disclose the methodology related to controlling or use of the dielectrophoresis force and since such a force is a complex matter, one of ordinary skill in the art would be required to exercise undue experimentation to replicate the applicant's claims.

Examiner's Note

6. Consistent with the above rejections under 35 USC 112, first paragraph, amendments to claims related to dielectrophoretic force are not considered on merits.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
> b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 9-10 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by McHardy et al. (US Patent 5,315,162, herein referred to as **McHardy**). Examiner suggests applicant review the entire teaching of McHardy, as its entire teachings have been relied upon.

Claims 1, 17

McHardy anticipates a physical neural network based on nanotechnology comprising (**McHardy,** C 1-6, particularly C 1, L 8-10; also C 2, L 45-54; ¶ 14 applies; from specification @ p22:1-3, nanoconductor … nanotechnology .. can be implemented as a molecule or groups of molecules), a dipole-induced comprising a connection network (**McHardy**, Figs. 1, 2; dipole is two poles; neural networks are inherently a connection network, as proper operation requires numerous weighted connections and other requirements) comprising a plurality of electrically conducting nanoconnections

suspended and free to move about in a dielectric liquid solution located within a connection gap (**McHardy,** C 3, L 43-62; Fig. 1) formed between at least one input electrode and at least one output electrode (**McHardy,** C 1-6, particularly C 1, L 44 through C 2, 54 where it discusses the roles of the anode and the cathode), wherein at least one nanoconnection of said plurality of electrically conducting nanoconnections within said dielectric liquid solution can be strengthened or weakened according to an application of an electric field across said connection gap (**McHardy,** C 1-6, particularly C 1, L 44 through C 2, 54; also C 3, L 44 through C 4, L 7; strengthening or weakening corresponds to the amount of whiskers present in the interconnect channel, likewise the conductivity of that channel) and a plurality of physical synapses of said physical neural network formed from said electrically conducting nanoconnections of said connection network (**McHardy,** C 1-6, particularly C 2, L 45-54).

Claim 9

McHardy anticipates the physical neural network of claim 1 wherein said at least one input electrode comprises a pre-synaptic electrode and said at least one output electrode comprises a post-synaptic electrode (**McHardy,** C 1-6, particularly C 3, L 44-62).

Claim 10

McHardy anticipates the physical neural network of claim 9 wherein a resistance of said plurality of electrically conducting nanoconnections bridging said at least one pre-synaptic electrode and said at least one post-synaptic electrode is a function of a prior electric field across said at least one pre-synaptic electrode and said at least post-

synaptic electrode (**McHardy,** C 1, L 29 through C 2, L 4, where it discusses Bernard Widrow's "memistor's" capability to regulate resistance through the application of an electric field and also immediately following this discussion where it describes the process of metal migration, and how metallic whiskers grow to create an ohmic [resistive] contact between electrodes when a DC voltage is applied, the whiskers being the molecular conducting connections)

Claims 15, 19, 22

McHardy anticipates two electrode arrays aligned perpendicular to each other, wherein at least one of said at least two electrode arrays comprises said one input electrode and at least one other of said at least two electrode arrays comprises said at least one output electrode (**McHardy,** Fig. 1, C 3, L 44-62; ¶ 14. applies; applicant's arrays can be circular arrays that have a many faceted orientation to include perpendicular; such orientation is also achieved by McHardy in Fig.1).

Claim 23

McHardy anticipates nanoconnections among said plurality of electrically conducting nanoconnections comprise a plurality of interconnected nanoparticles (**McHardy,** C 4 L 8- 45; from specification @ p22:1-3, nanoconductor ... nanotechnology .. can be implemented as a molecule or groups of molecules; a metal whisker qualifies)

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 2-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHardy as applied to claim 1 above, and further in view of Gorelik (US Patent 5,864,835, herein referred to as **Gorelik**).

Claim 2

McHardy fails to teach wherein the physical neural network further comprises a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer.

Gorelik teaches wherein the physical neural network further comprises a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer (**Gorelik**: ¶ 14. applies; C 8 L 54 through C 9, L 35).

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Gorelik's semiconducting method of an approximation to an artificial biological neuron with this

insulation layer so as to maintain charge within the charge carrying layer indefinitely, thus allowing minimal leakage. (**Gorelik**: C 8 L 54 through C 9, L 35) Combining the electrochemical synapse with a semiconducting signaling device allows for greater flexibility in the application of the physical neural network, where it is to be implemented in different environments for different needs of fault-tolerance or physical structure or electrical requirements.

Claim 3

McHardy teaches wherein the gate of the physical neural network of claim 2 is connected to logic circuitry which can activate or deactivate individual physical synapses among said plurality of physical synapses (**McHardy**: C 1-6, particularly C 4, L 55 through C 5, L 9; some control mechanism is inherent to controlling this 'controlled forgetfulness' as applied to 'specific synaptic connections').

Claim 4

McHardy teaches wherein the gate of the physical neural network of claim 2 is connected to logic circuitry which can activate or deactivate groups of physical synapses of said plurality of physical synapses. (**McHardy**: C 1-6, particularly C 4, L 55 through C 5, L 9; some control mechanism is inherent to controlling this 'controlled forgetfulness' as applied to a 'low level back bias to all connections,' constituting a group).

Claim 5

McHardy fails to teach that the plurality of nanoconductors comprises semiconducting molecular structures. They are purely conducting structures in McHardy.

Gorelik teaches wherein the plurality of nanoconductors comprises semiconducting molecular structures (**Gorelik**: C 8 L 54 through C 10, L 63, where it discusses the charge carrying semiconductor device, which comprises semi-conducting molecular connections; from specification @ p22:1-3, nanoconductor … nanotechnology .. can be implemented as a molecule or groups of molecules).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Gorelik's invention for the reasons stated above (section: **Claim 2**).

Claim 6

McHardy fails to teach that the semi-conducting molecular structures comprise semi-conducting nanotubes.

Gorelik teaches wherein the semi-conducting molecular structures comprise semi-conducting nanotubes (**Gorelik**: C 8 L 54 through C 10, L 63, where it discusses the charge carrying semiconductor device, which comprises semi-conducting molecular connections).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Gorelik's invention for the reasons stated above (section: **Claim 2**)

Claim 7

McHardy fails to teach that the semi-conducting molecular structures comprises semi-conducting nanowires.

Gorelik teaches wherein the semi-conducting molecular structures comprise semi-conducting nanowires (**Gorelik**: C 8 L 54 through C 10, L 63, where it discusses the charge carrying semiconductor device, which comprises semi-conducting molecular connections).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Gorelik's invention for the reasons stated above (section: **Claim 2**)

Claim 8

McHardy fails to teach that the semi-conducting molecular structures comprise semi-conducting nanoparticles. They are purely conducting structures in McHardy.

Gorelik teaches wherein the semi-conducting molecular structures comprise semi-conducting nanoparticles. (**Gorelik**: C 8 L 54 through C 10, L 63, where it discusses the charge carrying semiconductor device, which comprises semi-conducting molecular connections. Nanoparticles are the atoms and molecules maintaining the connections at the nanometer scale, such as the atoms at the border of the n-type and p-type wells common in semi-conducting devices).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Gorelik's invention for the reasons stated above (section: **Claim 2**)

Claim Rejections - 35 USC § 103

11. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHardy as applied to claims 1 and 9 above, and further in view of Nunally (US Patent 5,615,30, herein referred to as **Nunally**).

Claim 11

McHardy fails to teach that the physical neural network wherein at least one generated pulse from said at least one pre-synaptic electrode and at least one generated pulse from said at least one post-synaptic electrode is determinative of synaptic update values thereof

Nunally teaches that at least one generated pulse from said at least one presynaptic electrode and at least one generated pulse from said at least one post-synaptic electrode is determinative of synaptic update values thereof (**Nunally**: C 1-7, particularly C 4, L 58 through C 5, L 8).

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Nunally's pulse driven training mechanism to be able to update vast amounts of synaptic weights of the network asynchronously with little computational requirements (**Nunally**: C 1, L 53-67).

Claim 12

McHardy fails to teach the neural network of claim 9 wherein a shape of at least one generated pulse from said at least one pre-synaptic electrode and at least one generated pulse from said at least one post-synaptic electrode is determinative of synaptic update values thereof

Nunally teaches a shape of at least one generated pulse from said at least one pre-synaptic electrode and at least one generated pulse from said at least one postsynaptic electrode is determinative of synaptic update values thereof. (Nunally: C 1-7, particularly C 2, L 40-46 as well as C 4, L 1-21).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Nunally's invention for the reasons stated above (section: Regarding claim 12)

Claim 13

McHardy fails to teach an adaptive neural network which is trainable based on said at least one generated pulse across said at least one pre-synaptic electrode and at least one generated pulse across said at least one post-synaptic electrode.

Nunally teaches an adaptive neural network which is trainable based on said at least one generated pulse across said at least one pre-synaptic electrode and at least one generated pulse across said at least one post-synaptic electrode (**Nunally**: C 1-7, particularly C 4, L 58 through C 5, L 8).

It would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's and Nunally's invention for the reasons stated above (section: **Claim 12**)

Claim Rejections - 35 USC § 103

12. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over McHardy as applied to claims 1 above, and further in view of Widrow (US Patent 3,222,654, herein referred to as **Widrow**).

Claim 16

McHardy fails to teach the physical neural network of claim 1 wherein a variable increase in a frequency of said electrical field across said connection gap strengthens said nanoconductors within said dielectric liquid solution.

Widrow teaches a variable increase in a frequency of said electrical field across said connection gap strengthens said nanoconductors within said dielectric liquid solution (**Widrow**: C 10, L 65 through C 11, L 10; the ability of the memistor to be used as a multiplier or a linear modulator with the appropriate addition of copper circuitry; an increase in frequency f, corresponds to the increase in the connection gap strength; Changing the frequency of the alternating current is still within the scope of the disclosed alternating current of Widrow, which is in direct correlation to the rate of deposition of the electroplating).

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical (nanoconductors in a dielectric liquid solution) synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Widrow's method of electrochemical plating. McHardy can be

seen as a closer approximation to the current state of the art offering miniaturization and thus the ability to use many of these neurons in parallel with little worry for space constraint.

Claim Rejections - 35 USC § 103

13. Claims 20 – 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over McHardy, in view of Gorelik and in further view of Widrow, and in further view of Nunally.

Claim 20

McHardy teaches a physical neural network based on nanotechnology comprising (**McHardy,** C 1-6, particularly C 1, L 8-10; also C 2, L 45-54; from specification @ p22:1-3, nanoconductor … nanotechnology .. can be implemented as a molecule or groups of molecules), comprising:

a dipole-induced connection network (**McHardy**, Figs. 1, 2; dipole is two poles; neural networks are inherently a connection network, as proper operation requires numerous weighted connections and other requirements); comprising a plurality of electrically conducting nanoconnections suspended and free to move about in a dielectric liquid solution within a connection gap (**McHardy**: C 3, L 43-62; Fig. 1) formed between at least one pre-synaptic electrode and at least one post-synaptic electrode (**McHardy**: C 1-6, particularly C 1, L 44 through C 2, 54 where it discusses the roles of the anode and the cathode … pre and post synaptic), wherein at least one molecular connection of said plurality of electrically conducting nanoconnections with said

dielectric liquid solution can be strengthened or weakened to an application of an electric field across said connection gap and said at least one pre-synaptic electrode and said at least one post-synaptic electrode (**McHardy**: C 1-6, particularly C 1, L 44 through C 2, 54; also C 3, L 44 through C 4, L 7; strengthening or weakening corresponds to the amount of whiskers present in the interconnect channel, likewise the conductivity of that channel)

a plurality of physical synapses of said adaptive physical neural network formed from said nanoconnections (**McHardy**: C 1-6, particularly C 2, L 45-54; Fig. 1) and

wherein a resistance of said electrically conducting nanoconnections of said adaptive physical neural network bridging said at least one pre-synaptic electrode and said at least one post-synaptic electrode is a function of a prior electric field across said at least one pre-synaptic electrode and said at least post-synaptic electrode (**McHardy**, C1 L 29 through C 2, L4 where it discusses Bernard Widrow's "memistor's" capability to regulate resistance [it does this through the application of an electric field] and also immediately following this discussion where it describes the process of metal migration, and how metallic whiskers grow to create an ohmic [resistive] contact between electrodes when a DC voltage is applied, the whiskers begin the molecular or nano conducting connections).

McHardy fails to teach wherein the physical neural network comprises a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer, and that the physical neural network wherein a variable increase in a frequency of said electrical field across said connection gap strengthens said electrically conducting

nanoconnections of said adaptive physical neural network, and wherein the adaptive neural network is trainable based on said at least one generated pulse across said at least one pre-synaptic electrode and at least one generated pulse across said at least one post-synaptic electrode.

Gorelik teaches wherein the physical neural network further comprises a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer (**Gorelik**: C 8 L 54 through C 9, L 35).

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Gorelik's semiconducting method of an approximation to an artificial biological neuron with this insulation layer so as to maintain charge within the charge carrying layer indefinitely, thus allowing minimal leakage. (**Gorelik**: C 8 L 54 through C 9, L 35) Combining the electrochemical synapse with a semiconducting signaling device allows for greater flexibility in the application of the physical neural network, where it is to be implemented in different environments for different needs of fault-tolerance or physical structure or electrical requirements.

Widrow teaches the ability of the memistor to be used as a multiplier or a linear modulator with the appropriate addition of copper circuitry. (**Widrow**: C 10, L 65 through C 11, L 10) An increase in frequency f, corresponds to the increase in the connection

gap strength. Changing the frequency of the alternating current is still within the scope of the disclosed alternating current of Widrow, which is in direct correlation to the rate of deposition of the electroplating.

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Widrow's method of electrochemical plating. McHardy can be seen as a closer approximation to the current state of the art offering miniaturization and thus the ability to use many of these neurons in parallel with little worry for space constraint.

Nunally teaches an adaptive neural network which is trainable based on said at least one generated pulse across said at least one pre-synaptic electrode and at least one generated pulse across said at least one post-synaptic electrode (**Nunally**: C 1-7, particularly C 4, L 58 through C 5, L 8).

Being from the same field of endeavor, physical neurons (of artificial neural systems) and synapses thereof to mimic the behavior of biological neurons, it would have been obvious to one of ordinary skill at the time of applicant's invention to combine McHardy's electrochemical synapse which provides easy miniaturization of the vast amounts of neurons needed to simulate biological neurons with Nunally's pulse driven training mechanism to be able to update vast amounts of synaptic weights of the network asynchronously with little computational requirements (**Nunally**: C 1, L 53-67).

Claim 21

McHardy does not teach a gate located adjacent said connection gap, insulated from electrical contact by an insulation layer wherein said gate is connected to logic circuitry which can activate or deactivate individual physical synapses among said plurality of physical synapses or which can activate or deactivate groups of physical synapses of said plurality of physical synapses. (**Gorelik**: C 8 L 54 through C 9, L 35; C 10, L 29-40; Fig. 2, Fig. 4; the gate is CCSD 102 which can activate/deactivate other synapses).

Response to Arguments

14. Applicant's arguments filed on December 18, 2006 related to Claims 1-13, 15-17 and 19-23 have been fully considered but are not persuasive.

In reference to Applicant's argument:

Applicant' response pages 8-21.

Examiner's response:

Material contained in pages 8-21 is acknowledged. ¶ 18. applies. The claims and only the claims form the metes and bounds of the invention. Limitations appearing in the specification but not recited in the claim are not read into the claim. The Examiner has full latitude to interpret each claim in the broadest reasonable sense. ¶ 4. above applies.. Prior Office Actions apply.

In reference to Applicant's argument:

Claims 1, 17: Applicant's response pages 22-30.

Examiner's response:

¶ 18. applies. While the applicant's response is extensive, applicant has not raised any issues that were not responded to in a prior office action. Prior office actions apply.

In reference to Applicant's argument:

Claim 9: Applicant's response page 30.

Examiner's response:

¶ 18. applies. While the applicant's response is extensive, applicant has not raised any issues that were not responded to in a prior office action. Prior office actions apply.

In reference to Applicant's argument:

Claim 10: Applicant's response page 30, 31

Examiner's response:

¶ 18. applies. McHardy at c1:37-40 controls the plating which at any given time is a function of a prior electric field ... physical laws dictate such effects. Prior office actions apply.

In reference to Applicant's argument:

Claims 15, 19, 22: Applicant's response pages 31, 32

Examiner's response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

In reference to Applicant's argument:

Claim 23: Applicant's response pages 32, 33

Examiner's response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

In reference to Applicant's argument:

Claim 2: Applicant's response pages 33-36

Examiner's response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

In reference to Applicant's argument:

Claim 3: Applicant's response pages 36-37

Examiner's response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

In reference to Applicant's argument:

Claim 3: Applicant's response pages 37-38

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Claim 5: Applicant's response pages 38-40

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Claim 6: Applicant's response pages 40-42

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Claim 7: Applicant's response pages 42-44

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Claim 8: Applicant's response pages 44-46

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Claim 11: Applicant's response pages 47-48

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Claim 12: Applicant's response pages 49-50

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Claim 13: Applicant's response pages 50-52

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Claim 16: Applicant's response pages 52-59

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Claim 20: Applicant's response pages 59-63

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Claim 21: Applicant's response pages 63-64

Response:

¶ 18. applies. Applicant has not cited related new arguments. Prior office actions apply.

Examination Considerations

15.. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris,* 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

16. Examiner's Notes are provided with the cited references to prior art to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but a link to prior art that one of ordinary skill in the art would find inherently appropriate.

17. Unless otherwise annotated, Examiner's statements are to be interpreted in reference to that of one of ordinary skill in the art. Statements made in reference to the condition of the disclosure constitute, on the face of it, the basis and such would be

obvious to one of ordinary skill in the art, establishing thereby an inherent prima facie statement.

18. Examiner's Opinion: ¶¶ 15.-17. apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense. In response to this Office Action, the applicant is invited to identify new issues or grounds that have not been previously identified and responded to. Applicant is reminded that that which is in the record is in the record and not subject to further discussion without new grounds or reasons related thereto. The greater portion of the applicant's response dated December 18, 2006 was appropriately addressed in prior office actions.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Claims 1-13, 15-17 and 19-23 are rejected.

Correspondence Information

21. Any inquiry concerning this information or related to the subject disclosure should be directed to the Primary Examiner, Joseph P. Hirl, whose telephone number is (571) 272-3685. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, David R. Vincent can be reached at (571) 272-3080.

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

Hand delivered to:

Receptionist,

Customer Service Window,

Randolph Building,

401 Dulany Street,

Alexandria, Virginia 22313,

(located on the first floor of the south side of the Randolph Building);

or faxed to:

(571) 273-8300 (for formal communications intended for entry.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have any questions on access to Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Joseph P. Hirl
Primary Examiner
February 28, 2007